

HOW EFFECTIVE ARE HUNTING PEREGRINES?

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ABSTRACT - Data on Peregrine Falcon (*Falco peregrinus*) hunting success are reviewed. Breeding adults have a mean success rate of 34.9%, significantly higher than adults in the non-breeding season which have a rate of 12.7%. Juveniles have a success rate of 7.3%, significantly lower than non-breeding adults. Factors affecting hunting success rates are discussed.

Since Rudebeck (1950-51) published his results on the hunting efficiency of some migrating raptors, the hunting abilities of the Peregrine Falcon (*Falco peregrinus*) have been widely discussed. I have analyzed available data on this subject in order to trace any differences in hunting success between different categories of peregrines.

RESULTS

Data on peregrine hunting efficiency are presented in Table 1. In addition, Monneret (1973) found a success rate of a. 10% (37 out of a. 400 attacks) for peregrines in a French mountain area.

The variation in hunting performance is enormous (7 - 83% success rate). Juveniles are significantly less successful than adults outside the breeding season, with success rates of 7.3 and 12.7%, respectively ($X^2 = 7.2$, $P < 0.01$, sources 1,7,12 and 3,5,7,15 (Table 1)). A few of Rudebeck's (1950-51) birds may be adults, so the difference is probably slightly greater.

Breeding adults are more successful (34.9%) than adults outside the breeding season (12.7%) ($X^2 = 149.1$, $P < 0.001$, sources 2,3,4,6,9,10,11,13,14 and 3,5,7,15 (Table 1)).

Data on sexual differences in hunting efficiency

Table 1. Studies on Peregrine Falcon hunting success

AUTHOR	HUNTING SUCCESS %	N	COMMENTS
1. Rudebeck 1950-51	7.3	260	Migration
2. Hantge 1968	17.0	69	Breeding ♀
"	11.0	121	Breeding ♂
3. Lindberg 1975	13.7	350	Winter, ad. ♀
4. "	13.7	51	Breeding
5. Clunie 1976	9.6	62	Winter, ad. ♀
6. Parker 1979	15.0	83	Breeding ♀
"	17.0	30	Breeding ♂
7. Dekker 1980	7.7	674	Migration
"	9.8	215	Adults
"	7.1	363	Juveniles
8. Hantge 1980	10.8	529	All year (only adults?)
9. Treleven 1980	69.0	45	Breeding, "High Intensity"
"	30.0	10	Breeding, "Low Intensity"
10. Bird & Aubry 1982	35.0	197	Breeding pair
11. Cade 1982	83.2	183	Breeding ♂ ("Red Baron")
12. "	40.0	25	Subadults
13. "	31.0	32	Breeding
14. Thiollay 1982	25.4	318	Breeding Pair
"	16.5		♂
"	23.3		♀
"	37.8		Co-operative
15. Olsen & Roalkvam(unpub.)	13.7	453	Winter, ad. ♀

in breeding peregrines are too scarce to warrant an analysis, but Thiollay (1982) found that cooperative hunts were significantly more successful than when either bird hunted alone.

DISCUSSION

Although there is great variation in recorded hunting success, most studies reveal a success rate of 10 - 40%. This rather low rate is to be expected when predation is an important mortality factor for the prey species involved. The "life - dinner principle" has been put forward by Dawkins and Krebs (1979) to explain this: rabbits run faster than foxes because the rabbit runs for its life while the fox is only running for its dinner. Selection pressures are therefore stronger in improving the prey's anti-predator strategies than on the ability of predators to make successful hunting attempts. It is also to be expected that the success rate is lower for a predator (e.g. a peregrine) hunting evasive and agile prey than for a predator hunting less evasive prey, e.g. some fish species or insects (see Curio 1976: 193).

That juveniles are less able hunters than are adults is not surprising, as learning is very important in shaping hunting efficiency. Newly fledged peregrines often make attacks on flowers and insects as well as on more relevant prey. For a detailed account of the ontogeny of the behavior of young peregrines, see Sherrod (1983).

The higher hunting efficiency of breeding peregrines relative to birds outside the breeding season is interesting and has been noted by several authors, e.g. Dekker (1980) and Bird and Aubry (1982). This is often explained by a presumed higher motivation to make successful kills when hunting for young (Dekker 1980), resulting in more persistent pursuits by these birds than by non-breeding adults. There are other factors which may be equally important in explaining the difference: birds often form flocks in the non-breeding season, while they space out in the breeding season. Flocks are more vigilant and individuals harder to catch than lone birds (Kenward 1978). Further, there are large numbers of young, inexperienced birds during summer which should be easier to catch. It may also be that the difference in available prey species between seasons may affect the overall success rate. It is well documented that hunting success varies with prey species (Bird and Aubry

1982; Thiollay 1982). Finally, cooperative hunting which yields a higher success rate (Thiollay 1982) is restricted to the breeding season at least in areas where the peregrines are migratory.

Individual differences in hunting ability also occur. A notable exception in Table 1 is the "Red Baron", a released tiercel hunting from high perches over coastal marshes. In 1979 the Baron caught 95 birds in 102 hunts, a success rate of 93% (Cade 1982).

The availability of large open areas, e.g. coastal marshes, lakes or sea, is presumably favorable for hunting peregrines. Hunt et al. (1975) noted that peregrines sometimes missed intentionally and repeatedly in their stoops on released pigeons. When the pigeon took to the air, the falcon would guide it toward the ocean where escape possibilities were less. Also, the availability of suitable perches to hunt from is important. Treleven (1980) observed that "still hunting" from a perch was more successful than when hunting "waiting on" on the wing.

Treleven (1961, 1980), Hantge (1968), Dekker (1980) and Ratcliffe (1980) agree that a large portion of the peregrine's hunting attacks are not "serious". Hantge states that 20-40% of the attacks are of this category. Treleven (1980) introduces the terms "Low Intensity" and "High Intensity" hunting to distinguish between the serious hunts and the others, with a success rate of 30% and 69%, respectively. The distinction between the two modes of hunting is however subjective and of little use in many situations. Even serious hunts may be given up long before contact is made. When the falcon is hunting from a perch, the hunt often lasts for only some seconds. In such instances it is virtually impossible to assess the "seriousness" of the hunt.

Playful hunting is well documented for young peregrines (Parker 1979; Sherrod 1983) where it occurs regularly when learning to hunt. In adults, "non-serious" attacks may be involved when 1) teaching the young to hunt, 2) chasing away intruders in the nesting area and mobbing birds, 3) testing a flock of birds before deciding to attack. Stoops meant to drive prey toward open areas, or to single out an individual from a flock should be considered part of the ordinary "serious" hunting process. The existence of "practice" attacks only meant to perfect hunting skills cannot be excluded, but it seems unlikely, especially in the breeding season, that a peregrine deliberately should avoid making a kill.

Food is a limiting factor that influences the breeding success (e.g. Thiollay 1982), and each extra prey (which can be cached for later use) reduces the possibility that the young may starve before fledging.

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POSITION ANNOUNCEMENT — POSTDOCTORAL ASSOCIATE (70%)— Location: Department of Veterinary Biology, College of Veterinary Medicine, University of Minnesota. Requirements: Ph.D. in Physiology and one year of research experience working with avian species required. Two years research experience to include an interest and experience in fields of digestive function or avian energetics is desirable. Duties: The individual in this position would be expected to perform studies on neutral and/or hormonal regulation of avian GI motility and secretion. Salary: \$14,000/9 months (70% time). Application Deadline: 15 July 1985. Beginning Date: 1 September 1985.

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